STATE OF CALIFORNIA — THE RESOURCES AGENCY **GRAY DAVIS, *Governor***

CALIFORNIA ENERGY COMMISSION
1516 Ninth Street
Sacramento, California 95814-2950
Web Site: www.energy.ca.gov

July 26, 1999

Members of the Senate Energy, Utilities and Communications Committee
Members of the Senate Budget and Fiscal Review Committee
Members of the Senate Appropriations Committee
Members of the Assembly Utilities and Commerce Committee
Members of the Assembly Budget Committee
Members of the Assembly Appropriations Committee
California State Capitol Building
Sacramento, California 95814

Re: California Energy Commission's Quarterly Report
Concerning the Public Interest Energy Research Program

Dear Members:

In accordance with Public Resources Code Section 25620.5(h), the California Energy Commission hereby transmits its Quarterly Report regarding the Public Interest Energy Research (PIER) Program, for the period April 1 through June 30, 1999. The attached report provides the required "evaluation of the progress and a status of the [PIER Program's] implementation" for this quarter.

To date, the Energy Commission has made substantial progress in meeting the goals of the PIER Program, as demonstrated by the early results of PIER-funded projects that will help improve the quality of life for California citizens (see attached report for descriptions of project results). Should you have questions or comments concerning this report, please feel free to contact Traci Stevens, Director of Governmental Affairs, at 654-4942.

Respectfully submitted,

DAVID A. ROHY, Ph.D.
Vice Chair and Presiding Member
Research, Development and
Demonstration Committee

ROBERT A. LAURIE
Commissioner and Associate Member
Research, Development and
Demonstration Committee

Attachment

cc: Legislative Analyst's Office

California Energy Commission's Quarterly Report Concerning the Public Interest Energy Research Program (April 1 through June 30, 1999)

California Energy Commission
Attn: Governmental Affairs Office
1516 9th Street, MS-30
Sacramento, California 95814
(916) 654-4942

California Energy Commission's Quarterly Report Concerning the Public Interest Energy Research Program (April 1 through June 30, 1999)

In accordance with Public Resources Code (PRC) Section 25620.5(h), this document hereby constitutes the California Energy Commission's Quarterly Report for the Public Interest Energy Research (PIER) Program, covering the period from April 1 through June 30, 1999. This report provides the required "evaluation of the progress and a status of the PIER Program's implementation" for this past quarter. It also provided input for the Energy Commission's more detailed "Annual Report Concerning the Public Interest Energy Research Program" (hereafter referred to as the Annual PIER Report), required pursuant to PRC Section 25620.8.

A. Summary Status of the PIER Program

As specified in PRC Section 25620, the primary mission of the PIER Program is to "improve the quality of life of this state's citizens . . . [by funding] public interest energy research, development and demonstration [RD&D] projects that are not adequately provided for by competitive and regulated energy markets." The funds for this program, totaling approximately $61.8 million annually, come from the electricity ratepayers of specified investor-owned utilities and are held in the PIER Program Trust Fund Account.

During the second quarter of 1999, the Energy Commission developed and managed contracts for 86 PIER projects and two specific RD&D memberships that received approximately $69 million in PIER funding awards from the Energy Commission during 1998 and 1999.

Also during the second quarter of 1999, plans for the six PIER subject areas were refined and integrated. (The six areas are Building End-Use Efficiency, Industrial/Agriculture/Water Energy Efficiency, Environmentally Preferred Advanced Generation, Renewable Generation, Energy-Related Environmental Research, and Strategic Energy Research.) The integrated plan was reviewed by the Energy Commission's PIER Policy Advisory Council. This planning and policy work will be completed during the third quarter of 1999, with assistance from the Commission's technical support contractor A.D. Little, Inc. The Energy Commission made significant progress in preparing and targeting future funding efforts in six key PIER subject areas.

Further details concerning the Energy Commission's PIER Program activities for the second quarter are provided below.

B. PIER Program Results and Funding for This Quarter

(1) Project Results from Competitive Solicitations

In 1998, the Energy Commission successfully completed three competitive solicitations that provided approximately $49 million in PIER funds for 83 projects in five identified subject areas. The subject

areas include renewable generation, environmentally preferred advanced generation, end-use energy efficiency, energy-related environmental research, and strategic energy research.

Currently, 16 of the 20 projects from the First General Solicitation have fully executed contracts. The duration of these contracts is June 24, 1998, to March 31, 2002. Fifteen of the 24 projects from the Second General Solicitation have fully executed contracts. The duration of these contracts ranges from October 14, 1998, to March 31, 2004.

During the second quarter, the Energy Commission received early interim results from the following Transition-funded projects:

(a) M-C Power Fuel Cell Project

This PIER-funded environmentally preferred advanced generation project with San Diego Gas and Electric (SDG&E) assists in the advancement of molten carbonate fuel cell (MCFC) technology. In 1995-1997, SDG&E collaborated with M-C Power to demonstrate a 250-kW MCFC power plant at Miramar Naval Air Base in San Diego, California. Based on the lessons learned, the Energy Commission awarded SDG&E $300,000 in PIER funds to modify the existing balance-of-plant (BOP) to accept the M-C Power's next generation 75-kW MCFC. These modifications and improvements are now completed, plant operators have been fully trained on the plant operation and control system, and the BOP has been fully tested and readied for start-up. The demonstration of the 75-kW MCFC is currently underway and will continue until end of 1999.

Benefit: Successful completion of the MCFC testing and demonstration will provide performance verification of commercial design and will advance this very clean and efficient technology to commercialization within several years.

(b) Desert Mountain Air Transport (DMAT*)*

This PIER-funded environmental research project with Edison Technology Solutions (ETS) develops and applies new methods for characterizing and quantifying the regional transport and chemistry of visibility-impairing emissions (haze) leading to improvements in regional visibility in California. The Energy Commission awarded ETS $825,000 in PIER funds to conduct extensive data interpretation to assess the contribution of Mojave Power Plant (MPP) emissions to the haze problem at Grand Canyon National Park (GCNP) and other “Class I” areas in the Western United States. (Class I refers to areas that are supposed to be pristine or hold special national or regional value from a natural, scenic, recreational or historical perspective, such as national parks). The early results of data interpretation show that the greatest frequency of transport from MPP to GCNP occurred during the summer, but a better understanding of SO2-to-sulfates conversion is needed to ascertain that the MPP’s contribution to the visibility problem in GCNP is significant. The data collected will be used to verify the results of existing modeling methods and to develop a visibility module of the model.

Benefit: This module will be incorporated into the Southern California Air Quality Management District’s Urban PM2.5 planning model.

(c) System Stability and Reliability: Flexible AC Transmission Systems (FACTS) Study

This PIER-funded strategic energy research project with SDG&E investigates the feasibility of implementing Flexible AC Transmission System (FACTS) devices on Extra High Voltage (EHV) electricity transmission lines. The goal of this study is to increase power transfer capability and electricity import capability in the SDG&E service area in order to meet the forecasted future electrical load. The Energy Commission awarded SDG&E $100,000 in PIER funds to conduct technical studies and economical analyses to investigate the benefits of installing FACTS devices on the SDG&E transmission network. The results from this study indicate that the preferred option is to install an 85 MVA Unified Power Flow Controller on 230 kV lines at the Talega Substation to increase SDG&E's simultaneous and non-simultaneous import capability. In addition, the Unified Power Flow Controller will provide 85 MVAs of dynamic reactive power support.

Benefit: The FACTS device should improve SDG&E's import capability and system reliability, resulting in the ability to postpone the need for new transmission lines for many years.

(2) Electric Power Research Institute Membership

In 1998, the Energy Commission provided $1.536 million in PIER funds for a one-year pilot membership (1999) with the Electric Power Research Institute (EPRI), a national nonprofit research organization. This funding allows the Energy Commission to participate in guiding RD&D activities in specified areas and may help to ensure that California continues to receive the benefits of these nationally funded electricity RD&D efforts. Through the EPRI membership, the PIER Program conducts California-specific electricity-related research in the following seven target areas:

1) Water and waste water treatment
2) Food processing
3) Agriculture
4) Improved use of natural gas
5) Advanced metering
6) Distributed generation
7) Grid system reliability

At the Energy Commission Business Meeting on April 28, 1999, the staff highlighted the numerous benefits expected to result from this EPRI membership. These benefits to California include potential electricity cost savings, increased energy efficiency, public safety, risk reduction, and improvements to the environment. The benefits also include professional exposure to a global network of experts and the opportunity to conduct collaborative research with research and development (R&D) organizations from around the world. The Energy Commission plans to transfer these benefits to the public with targeted products for proactive program enhancement, the use of research results in reports, and the distribution of these reports to the public.

At a Business Meeting on June 23, 1999, the Energy Commission approved a contract amendment to augment the existing contract for the EPRI membership by $11,758,500. This amendment includes 23 additional research target areas for the years 1999 and 2000 and extends the term of the existing seven research target areas for another year (through the year 2000).

(3) Gas Research Institute Membership

On June 23, 1999, the Energy Commission approved using $365,100 in PIER funds for an 18-month membership with the Gas Research Institute. Similar to the EPRI membership described above, this funding will allow the Energy Commission to participate in guiding R&D activities with respect to the following program areas: advanced fuel cells, distributed generation, industrial waste processing, high efficient steam generation, and commercial cooling/heating pump applications. The membership is expected to begin on July 15, 1999.

(4) Central California Ozone Study

At an Energy Commission Business Meeting on June 28, 1999, PIER funding for the Central California Ozone Study project was approved. This environmental research project will be co-funded through a $3 million interagency agreement between the Energy Commission and the California Air Resources Board. This study will involve the collection and extensive analysis of data at monitoring stations in order to develop and refine models involving power plant air pollution emissions, formation, and transport. It is anticipated that an improved understanding of ozone formation and the role of NOx from distant sources will result from the data analysis leading to more effective air quality attainment strategies.

C. PIER Program Funding Efforts and Results for Next Quarter

The following section summarizes anticipated PIER Program support efforts for the next quarter in the following areas: Future PIER Funding Efforts and the Energy Innovations Small Grants Program.

(1) PIER Funding Efforts

During the second quarter of 1999, the PIER staff formulated drafts of Fiscal Year 1999/2000 procurements for the six key PIER subject areas. These funding proposals were presented to the Policy Advisory Council (PAC) at a meeting on June 21, 1999. A summary of the subject areas with funding plans in the upcoming quarter is provided below.

(a) **Building End-Use Efficiency** – At the PAC meeting, the staff presented plans for a competitive solicitation during the third quarter of 1999. Subject to enactment of the State Budget for fiscal year 1999/2000, the Energy Commission plans to award a total of approximately $6 million for the first year of the proposed program through a competitive “programmatic” solicitation. This programmatic funding mechanism is intended to provide program level support for interrelated public interest RD&D activities and will require individual applicants to request funding for a

collection of linked energy efficiency RD&D projects that address specific goals within a single proposal. This type of solicitation is intended to reduce duplication of effort and staff resources. The Energy Commission expects to award three separate programmatic contracts at funding levels of between $1.5 million and $2.5 million per year. This Request for Proposals (RFP) will be released in July 1999.

(b) **Environmentally Preferred Advanced Generation (EPAG)** – The staff presented plans for an interagency agreement that should be initiated in the third quarter of 1999. This two-year university grant will allow demonstration and testing of Microturbine Generators to help validate this technology and bring it broader market acceptance.

(c) **Industrial/Agriculture/Water Energy Efficiency** – The Industrial/Agriculture/Water staff outlined the primary goal of this subject area, which is to help California industries become more competitive in the restructured market. The Energy Commission has been successful in its efforts to increase the energy efficiency of the agricultural and water sectors and now wants to focus on achieving greater energy efficiency in the industrial sector to improve competitiveness and environmental impacts. To accomplish this goal, the Energy Commission is working with California industries and associations, such as the California Manufacturers Association, and plans to tailor the Department of Energy's Industries of the Future program to a California program.

(d) **Renewable Generation -** Staff presented plans for a competitive solicitation during the third quarter of 1999. This solicitation will be in the area of biomass small-scale generation, and will award a total of $1 million to innovative projects that advance cost effective, safe, reliable, and environmentally sound renewable technologies in a competitive marketplace. The expectation will be for the selected projects to produce near-term benefits. This RFP will be the first solicitation of the Fiscal Year 1999/2000 for this program area.

(e) **Strategic Energy Research –** The Strategic Science and Technology staff presented plans for several collaborative and match-funded programs. One, the Consortium for Electricity Reliability Technology Solutions (CERTS), has co-funding from DOE and the California Independent System Operator. It is expected to significantly improve system reliability. Targeted solicitations in the sub-areas of earthquake safety, communications and interface technologies, and energy storage technologies are also planned. The expected benefits include more ready access to electricity market for small and medium size businesses, more efficient market transactions, more stable and reliable systems and faster response to natural disasters.

(f) **Energy Related Environmental Research** – The goal of this subject area, as identified by staff, is to advance the science and understanding of the interaction between energy and the environment, including the environmental impacts and mitigation measures related to facility development and the use of energy to solve current environmental problems. The desired results of the data, analysis, and understanding are to direct the development of new technology to provide direct public benefits and to serve as a basis for improved environmental regulations of energy facilities.

(2) Energy Innovations Small Grant Program

The Energy Commission released its first solicitation for the Energy Innovations Small Grant Program on March 31, 1999. This program is intended to simplify the process for "proof of concept" research and development feasibility projects of small businesses, small non-profits, academic institutions, and individuals that are impacted by the costs of applying to typical PIER solicitations. The program will provide funding support for RD&D innovations that might otherwise not be successfully pursued. The maximum amount of any individual grant award is $75,000.

The proposals for the first grant program funding round were due on April 30, 1999. The Energy Commission received 89 initial grant proposals, an excellent response to this solicitation. Forty-one of these proposals passed the initial program eligibility screening, and on June 22-23, 1999, the Program and Technical Review Board met to complete the final scoring of the proposals. The Board ranked the 41 proposals, which resulted in 13 proposals recommended for funding.

The second solicitation elicited 54 proposals, which have not yet been evaluated. During the third quarter of 1999, these results will be presented to the Energy Commission's RD&D Committee and the full Energy Commission for final selection and funding of projects. The staff anticipate that additional grant proposals will be submitted and reviewed through this program in the third quarter of 1999.

D. Other PIER Program Activities

The following section summarizes PIER activities in the following areas: Information Transfer/Reporting, Policy Advisory Council, Improving PIER Contracting Procedures, and Developing PIER Information Management Tools.

(1) Information Transfer/Reporting Activities

A key goal of the PIER Program is to ensure that RD&D results are successfully transferred into the market. The Energy Commission has undertaken several steps to keep stakeholders, policy makers and the general public fully informed regarding PIER funded RD&D efforts. To help meet this goal, the staff is planning a PIER-related symposium to facilitate the exchange of relevant information and ideas among researchers, technology users, and other interested parties from throughout the state, nation, and international community. This symposium will be held during October 25-27, 1999, in San Diego, California.

(2) Policy Advisory Council

During the second quarter of 1999, the Policy Advisory Council held a day-long public meeting, which took place on June 21, 1999. The Council provided guidance and feedback on the six PIER subject area plans presented by the Energy Commission staff. Also, consultants from A.D. Little presented the Council with an overview of their work on the Integrated Research Plan. The purpose of the Integrated Research Plan is to bring together the six subject area plans and to meet the common goal of providing benefits to California ratepayers. The tasks of A.D. Little to prepare this plan included:

- Coordinating the six subject area plans
- Describing the management plan
- Establishing measures for strong market connectedness
- Building a body of knowledge
- Developing measurements for performance and progress

Phase II of A.D. Little's work will be completed in October 1999.

(3) Improving PIER Contracting Procedures

During the second quarter of 1999, the Energy Commission staff completed draft regulations and procedures for conducting competitive negotiations for future PIER contract solicitations. The Energy Commission also initiated a pilot solicitation to test these procedures in anticipation of adopting related regulations later in 1999. Developing an effective process for conducting competitive negotiations is important for the PIER Program because it will allow the Energy Commission to negotiate with bidders before they submit their final bids, thereby improving the quality of RD&D proposals and the subsequent work.

(4) Developing PIER Information Management Tools

Also, during the second quarter of 1999, the contract manager section of the Research Contract Management System (RCMS) software program became fully operational and the staff were trained in its use. The RCMS is an internet-based software program that allows managers to more efficiently track projects and contracts. The Energy Commission staff is currently working to ensure that the RCMS will meet the needs of PIER contract managers and researchers. The accounting portion of the program will become operational in the third quarter of 1999.

(4) PIER Program Evaluation

During the second quarter of 1999, a contract was approved with the Gas Research Institute (GRI), who will begin the planning and implementation of a research, development and commercialization (RD&C) project review tool for the Energy Commission. The purpose of this project is to implement a standardized research project evaluation methodology for each of the PIER Program Focus Areas: Renewable Energy, End-Use Energy Efficiency, Energy-Related Environmental Research, Environmentally Preferred Advanced Generation, and Strategic Energy Research. This methodology will allow the staff to identify only those research opportunities that will actually deliver benefits to California ratepayers in a timely fashion. The staff proposes to take an existing review process, GRI's "RD&C Stages and Gates Review Process," and adapt it to the requirements of each of the PIER Focus Areas.

F. Conclusion

The Energy Commission remains fully committed to administering the PIER Program in an efficient and effective manner that ensures public input and accountability. The PIER section of the Energy Commission's Web Site can be accessed at:

www.energy.ca.gov/research/PIER

This Web Site is one of the most effective means of communicating with stakeholders and the public regarding the PIER Program. The Energy Commission staff also plans to have a PIER Program brochure available in Legislators' offices in late 1999.

In summary, the Energy Commission continues to successfully develop and implement the PIER Program, in accordance with the directives contained in AB 1890 and SB 90. Should you have questions or comments, please feel free to contact Traci Stevens, Director of Governmental Affairs, at 654-4942.